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JEAN MARCHANT; AN EIGHTEENTH CENTURY MUTATIONIST[1]

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JEAN MARCHANT was the son of Nicholas Marchant (died, Paris, 1678), director of the Jardin du Roi, the principal author of the famous "Mémoires pour servir a l'histoire des Plantes," published in 1676 under the auspices of l'Académie royale des Sciences and edited by Dodart.[2]

The name Marchant is perhaps most familiar in connection with the genus *Marchantia,* which, though not unfrequently attributed to Linnæus, was named by Jean Marchant in honor of his father,[3] when, because of his discovery of the "flower" and "seeds," he removed it from the genus *Lichen,* under which it formerly had figured as *Lichen petræus stellatus.*[4]

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[1] Contribution from the Botanical Laboratory of the University of Michigan, No. 121.

[2] Clos, D., "Les trois premiers botanistes de l'Académie royale des Sciences, Dodart et les deux Marchant," *Bull. Soc. bot. France,* 35: 285, 1888. In this paper Clos goes to great length in a successful attempt to show that Nicholas Marchant was the chief contributor to the work just referred to, though a simple reference to a statement on the part of the academy and which curiously enough seems to have escaped him, would at once have settled the matter beyond question. In "Table Alphabétique des matières contenues dans l'Histoire et les Mémoires de l'Académie Royale des Sciences," publiée par son ordre, 1: 200, 1666–1698, 1778, one reads: "Marchant [M. Nicholas] a fourni tout le Botanique des Mémoires pour servir à l'Histoire des Plantes. T. 4, p. 122."

[3] Marchant, J., "Nouvelle découverte des fleurs et des graines d'une plante rangée par les botanistes sous le genre du Lichen," *Mém. de l'Acad. roy. d. Sc.,* 1713, pp. 229–234. "Nous établirons pour cette plante un nouveau *genre* que nous appellerons *Marchantia* du nom de feu M. Marchant, mon père, qui le premier eut l'honneur d'occuper une place de botaniste dans cette Académie, lorsque le Roy en 1666 créa cette Compagnie."

[4] Caspar Bauhin, Pin. 362.

It was indeed a discovery far beyond mediocrity and indicative of excellent powers of observation. For since the days of Cæsalpino but little advance seemed to have been made as to the organs of reproduction. Even one of Linnæus's first papers, "Præludia Sponsaliorum arborum," deals with the sexes of plants, and, attracting the attention of Olaf Rudbeck (1729), secured for the "father of botany" *in spe*, the position of assistant.[5]

Darwin, in the introduction to his "Origin of Species," points to Buffon as the first transmutationist, though, as he says, it was the views of Lamarck which first attracted general attention. But long before their time, when Buffon was but a boy of twelve, Jean Marchant had made some very pertinent observations on the sudden origin of species. Believing genera to have been created as such, a view expressed in his early days by Linnæus himself in his "Systema Naturæ,"[6] he was able to see new "species" originate suddenly. He had at his disposal a garden, probably already used by his father,[7] who was an ardent collector and introduced the seed of many foreign plants, growing and describing them.[8] His observations were made upon *Mercurialis annua*, the dog's mercury,[9] a plant long known as possessing certain reputed virtues.[10]

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[5] Wittrock, Veit B., "Nagra ord om Linné och hans betydelse för den botaniska Vetenskapen," *Acta Horti Bergiani*, 4: No. 1, 1907.

[6] Genus omne est naturale, in primordio tale creatum."

[7] Presumably the "Jardin du Roi." "Il [Nicholas Marchant] faisoit cultiver au Jardin Royal celles qui ne se trouvoient que difficilement à la campagne," *Hist. de l'Acad. roy. d. Sc.*, 1666–1686, 1: 200, Paris, 1733.

[8] "Hist. de l'Acad. roy. d. Sc.," 1680, p. 307.

[9] This term is also used for *M. perennis*, in which case the name French mercury is given to *M. annua*.

[10] It was supposed that the juice of species of *Mercurialis*, especially of the Mediterranean *M. tomentosa*, had the power to determine the sex of children, according to whether the mother drank the juice of the male or of the female plant. Unfortunately the true sex of the plant was not known, as also is apparent from Marchant's paper. Thus boy's mercury was the name applied to the female plant of *M. annua*, girl's mercury the name given to the plant with staminate flowers. Also, staminate flowers repeatedly have been observed on the pistillate plant (*f. ambigua*, Duby, "Bot. Gall.," 1: 417).

In 1715 Marchant noted in his garden[11] the appearance of a laciniate form of *Mercurialis annua,* which he designated *Mercurialis foliis capillaceis.* The next year, in the same part of the garden, this plant reappeared, being represented by four individuals. There appeared further two plants, the foliage of which, though also of a laciniate character, was sufficiently different to permit of their being readily distinguished. To these plants he applied the name *Mercurialis foliis in varias et inæquales lacinias quasi dilaceratis.* The description of the leaves at once leads us to recognize this plant as a typical laciniate form, especially his reference to "a large number of leaves, which, because of their irregular outline, resemble mere remnants of leaves torn or gnawed by caterpillars," curiously enough, the same expression which I used to describe the appearance of the leaves in the flowering shoot of *Arctium minus laciniatum.*

In an attempt to explain the successive appearance of these two new forms of *Mercurialis* we could assume that both forms had been created in 1714, but that the seed of one had germinated in 1715, while that of the other remained dormant for a year. It is, however, far more probable that but one plant of the first laciniate variety had been allowed to grow up, and that in the next year special orders were given to the gardener who had the care of this particular portion of the garden, to allow to grow all seedlings which in the least resembled those of *Mercurialis.* Still another possibility is that the first form, created in 1714, gave rise, in 1715, through a second mutation, to another, less laciniate form, which appeared in 1716.

After reporting these plants in 1719, Marchant makes no further mention of them, but de Candolle[12] refers to them, under *Mercurialis annua,* in the following terms:

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[11] Presumably the Jardin Royal. "Jean Marchant avait, ainsi que son père, le titre de directeur de la culture des plantes du Jardin du roi." Michaud, "Biog. Univ.," 26: 486, 2d ed.

[12] "Prod.," 15: 797.

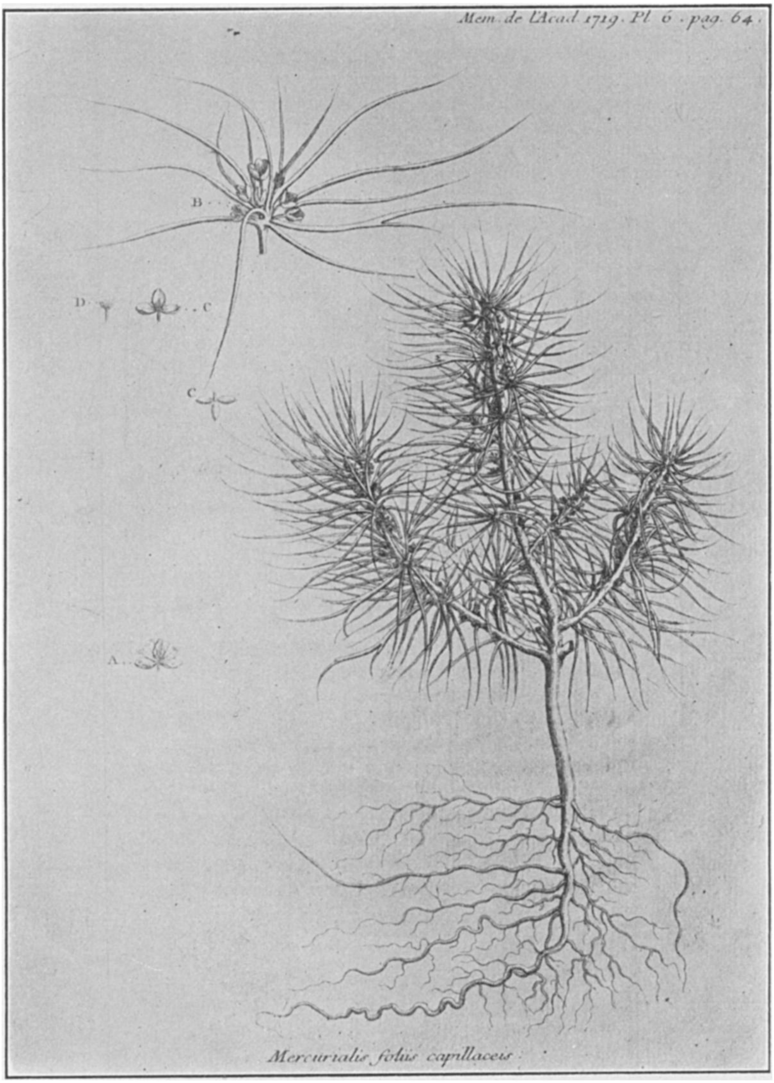
Mem. de l'Acad. 1719. Pl. 6. pag. 64.
B
D
C
C
A
Mercurialis foliis capillaceis

FIG. 1.

Monstrose occurrit: 1° *laciniata,* foliis laciniato-dissectis. ⊙ In Gallia (Marchant). — March. in *Act. Acad. Paris,* 1719, p. 59. t. 6. — 2° *capillacea* (Guep. "Flore Maine-et-Loire," ed. 3, p. 401), foliis ad lacinias auguste lineari-lanceolatas, lineares v. capillaceas integras reductis. ⊙ In hortis Andegaviæ et ad Issy-l'Evêque (Guepin, *l. c.,* Gren. et Godron,

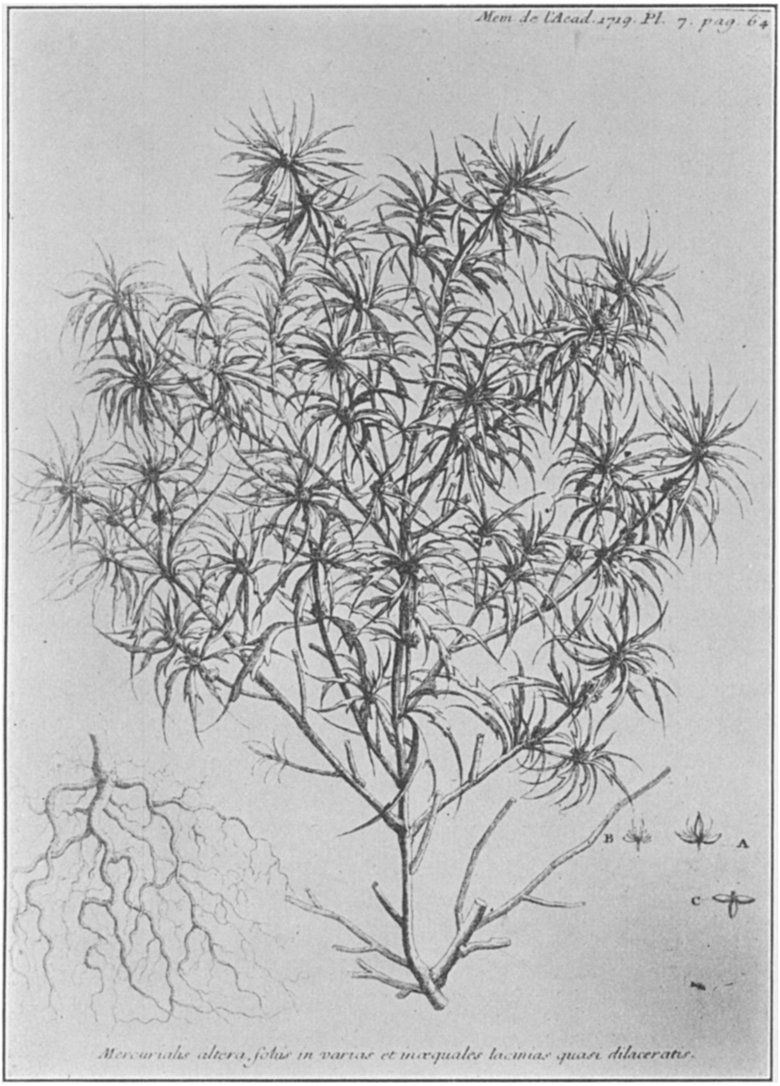
Mem. de l'Acad. 1719. Pl. 7. pag. 64
B
A
C
Mercurialis altera, foliis in varias et inæquales lacinias quasi dilaceratis.

FIG. 2.

"Flore de France," Vol. 3, p. 99). — Marchant in *Mém. de l'Acad. Paris,* 1719, p. 64, t. 6.

This discovery on the part of Marchant is particularly interesting for various reasons. In the first place because it is the second historical case of mutation on record. Further, because of a certain analogy with Sprenger's discovery of *Chelidonium majus laciniatum*.[13] Sprenger, an apothecary of Heidelberg, cultivated a large number of plants in his garden as was the custom in those days, and, about 1590, observed there a type of *Chelidonium majus* formerly unknown to him and to which he gave the name *Chelidonia major foliis et floribus incisis*. Tournefort, in his "Schola botanica," mentions three forms, *Chelidonium majus vulgare* C. B., *Ch. majus foliis quernis* C. B. (*Ch. folio laciniato* J. B.) and *Ch. majus foliis et flores minutissime laciniatis* Hort. reg. par. The second of these was identical with the variety discovered by Sprenger, the third a form which had originated in the Paris Botanic Garden and was distinguished from the other by the greater reduction of the leaf blade. Of the laciniate varieties of both *Chelidonium majus* and *Mercurialis annua* there exist therefore two forms. While those of *Chelidonium majus*, and especially the first, are fairly well known and may be encountered in almost any botanic garden, it is not so in the case of either of the laciniate varieties of *Mercurialis annua*. At least I do not remember seeing them, nor do I recollect the occurrence of their names in the seed-exchange lists annually published.

In at least one instance the claim has been made that one of the laciniate varieties of *Chelidonium majus* originated *de novo*[14] a claim which to Korschinsky[15] appears to lack foundation. No such claim has been made for one of the laciniate varieties of *Mercurialis annua*. However, as seen from de Candolle's account, given above, at least one of the laciniate forms was reported as occurring both in the botanic garden at Angers and also at Issy-lEvêque. These two towns, the first in Maine-et-Loire, the other in Saône-et-Loire, lie more than 200 miles apart. It is possible, perhaps, that the seed was brought from Paris to Issy-l'Evêque and from there transported accidentally to Angers. Or is it more probable that the variety originated a second time? It is a question which forever must remain unanswered, though it is not improbable that a French student, who most readily commands the means of research in this direction, could, by delving into historical records, perhaps throw some light upon the subject.

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[13] Roze, E., "Le *Chelidonium laciniatum* Miller," *Journ. de Bot.*, 9: 296, 1895.

[14] Clos, D., "Réapparition de la Chélidoine à feuille de Fumeterre," *Compt. rend.*, 115: 381, Paris, 1892.

[15] Korschinsky, S., "Heterogenesis und Evolution," *Flora*, 89: 240, 1901.

The work of Jean Marchant gives evidence, not only of great exactitude, but also of excellent powers of observation. Thus, a few years after his discovery of the laciniate forms of *Mercurialis annua,* he was able to give an account, and, as I believe, the first, of a myxomycete, of the "flowers of tan."[16]

As is evident from the description and drawings, he was dealing with a *Fuligo.* He recognized the vegetable character of the organism, but unfortunately places it with the sponges, giving it the name *Spongia fugax, mollis, flora et amoena, in pulveri coriari nasceus.* In this case, as in the other, Marchant's ambition did not lead him beyond a mere, apparently most accurate, description, something decidedly pleasing when we remember that in the same year Jean Marchant was elected to membership of the Académie (1678), there appeared Father Kircher's *Mundus subterraneus,*[17] and that one of his contemporaries was de Maillet (1656–1738), who "derived birds from flying fishes, lions from sea-lions, and man from *l'homme marin,* the husband of the mermaid!"

Believing genera to have been created as such, Marchant did not go beyond this point, but realized that species were derived from preexisting ones. His own words should be quoted here. As far as I am aware, there exists but one account of any length of Marchant's discovery, that of Korschinsky.[18] Godron refers to him[19] as does de Vries.[20]

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[16] Marchant, J., "Observation touchant une végétation particulière qui nait sur l'écorce du chêne battue, et mise en poudre, vulgairement appelée du Tan," *Mém. de Math. et de Phys. de l'Acad. roy. d. Sc.,* 1727: 335, Paris, 1729.

[17] Osborn, H. F., "From the Greeks to Darwin," 109, 1908. "The worthy priest describes orchids giving birth to birds, etc."

Since the original papers are rather inaccessible to the majority, it was deemed of interest to give here a translation of Marchant's two articles dealing with his discovery. The translation of course has been made as literal as possible. The first paper is merely a résumé of an address made before the academy by Marchant. The second gives a detailed account as published in the *Mémoirs*.

ON THE PRODUCTION OF NEW SPECIES OF PLANTS[21]

In the month of July, 1715, Mons. Marchant noted in his garden a plant which he did not know, and which attained a height of from five to six inches.[22] It persisted until the end of December, when it dried up and died. He believed to be able to class it only with the genus to which the mercury belonged; and since it was entirely new and thus far had not been described by authors, he called it *Mercurialis foliis capillaceis*.

The following year in the month of April, and in the same place where this plant had been, he saw appear six others, of which four were quite similar to the former, and two others sufficiently different to make another species of mercury, which he named *Mercurialis foliis in varias & inæquales lacinias quasi dilaceratis*. It persisted until the end of December, in which respect these two species are different from the common mercury, which, though annual like these, does not last as long.

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[18] *Loc. cit.*

[19] Godron, ''De l'espèce,'' 1: 160 (not seen).

[20] De Vries, H., ''Die Mutationstheorie,'' 1: 136, 1901. ''*Mercurialis annua laciniata* ist 1719 von Marchant als neue Form entdeckt worden; sie ist seitdem samenbestandig geblieben.''

[21] ''Hist. de l'Acad. roy. d. Sc.,'' 1719, p. 57, Paris, 1721.

[22] The French ''pied'' is equal to 1 foot 1⅛ inch of our measure and is divided into 12 ''pouces,'' each ''pouce'' being divided into 12 ''lignes.'' Pouce and ligne are translated inch and line, respectively.

These two new plants since have multiplied in a space of seven or eight feet, and, which is astonishing, never has Mons. Marchant been able to discover any signs of seed upon them. At the same time the slight extent of the plot upon which they reappear every year sufficiently shows that they must have been derived from seeds which probably fell upon it from preceding plants. Since some time ago were discovered the secret means which several plans make use of to hide their seed, it is all the more marvelous that there still are some which can succeed in hiding them.

But the principal reflexion of Mons. Marchant upon these two plants is that it would not be impossible for new species to be formed; for these have all the appearance of being such; how else could they have escaped all botanists? Art, culture and, still more, chance, that is to say, certain unknown circumstances, every day bring about novelties in interesting flowers such as the anemones and buttercups, and these novelties are treated by botanists as varieties only, which do not deserve to change the species; but why should nature be incapable of novelties which went thus far? It seems she is less constant and more diverse in plants than in animals, and who knows the limits of this diversity?

At this rate the old-time botanists would not have been wrong in describing so few species in a single genus; they were not acquainted with more, and it is time which has brought new ones. For the same reason the future botanists would be overwhelmed, and finally obliged to abandon the species to limit themselves to the genera. But ere forecasting that which will be, one must assure oneself of that which is.

OBSERVATIONS ON THE NATURE OF PLANTS

BY MONS. MARCHANT[23]

The researches which are made in Natural Science frequently demand long series of observations to arrive at a perfect knowledge of the subjects which one undertakes to deal with; and it is for this reason that one must not be astonished that the botanists have not yet discovered the seeds of a number of plants, though they knew these plants long since. One must be the less surprised about this since among these plants, there are several which can not be cultivated, and with which one meets accidentally only, and others which, because of their smallness, also bear only exceedingly small seeds, which frequently escape even the most observant. The observation of which we are about to speak is related to these kinds of investigations. It is in fact a matter of two plants which we deem to be of the same genus, but of different species, of which during the four years which we have known them, which we have studied them, it has been impossible for us to observe the seeds. These plants showed themselves to us for the first time in our garden; I had never seen them before, neither there nor in other places, and I do not know that botanists have made mention of them.

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[23] "Mém. d. Math. et de Phys. tir. d. Rég. de l'Acad. roy. d. Sc. de l'Année, MDCCXIX," p. 59, Fy. 1, 1719, Paris, 1721.

Yet they are sufficiently tall to be observed by those who apply themselves to a knowledge of the Simples, if they grew commonly in our gardens, just as are a number of other common plants; these new plants finally have reproduced themselves in our garden, from the time above mentioned, without one having been able to find seed upon them.

According to the smell of these plants and the structure of their flowers, I am satisfied they belong to the genus of the Mercury of which we here represent the flower (Fig. A, Pl. 1). To make known the nature of these herbs, we will begin by describing the first species which we observed in the month of July of the year 1715, and we shall name it *Mercurialis foliis capillaceis*.

The plant was five to six inches high, its stem was about two lines in thickness, bare at the base, round, of a pale green color, smooth, shiny and nearly transparent, provided with five branches, two of which, parallel and placed towards the base of the stem, were longer than two inches. The others were unequally shorter. The stem and the branches were rather irregularly beset with leaves without petioles, some alone and bare (*les unes seules et nues*), the others attached in bunches and intermixed, accompanied at their point of origin by several flower buds, which together, or leaving some spaces between them, surrounded the stem and the branches of this plant. The longest leaves ending in a sharp point measured about one inch, their width was half a line in the middle, some were wider at their base; some others were dissected towards the point in two very narrow strips of different lengths, and all of them were of a green-brown color, smooth, shiny and slightly indented along their length. These leaves pointed in this or that direction without order, some with the tip turned upward, the others downward, and others bent in sickle-like form. The smallest were placed horizontally. All were rather stiff, notwithstanding their delicate texture, and they appeared more or less like the principal veins of leaves which had been stripped of their lateral veins and of their parenchyma. The flowers which were collected in small clusters (*B*. nat. size) opened successively only. Their color approached a greenish yellow. They consisted of a calyx of three leaves *C* of an oval shape, shell-like, separated from each other at their point of origin by a cluster of ten or twelve very fine and very short filaments *D* which had no tips.[24] The flower was but a line in diameter and its pedicel was so short that it was hardly visible.

The root of this plant was a little less thick than its stem. It was from four to five inches long, twisted, forming slight undulations throughout its whole length, accompanied by several fibers similarly undulating and hairy, which branched of in all directions. Its internal substance was very white, hard and covered with a more or less fleshy bark of a white-yellow color.

The entire plant on being rubbed had a rank unpleasant odor and a nauseous flavor having something nitrous about it, closely approaching the taste of the common Mercury.

This plant persisted until the end of the month of December, after which it dried up and perished entirely.

This observation put me on the alert to discover this plant the following year. Until the end of the month of March I noticed nothing of that for which I was looking; but in April I saw appear six plants, of which four seemed to be the plant which just now has been described. The two others were slightly different from the preceding, in that they had larger leaves. These and the others increased in size, and I had the pleasure to observe among these six plants a second species which as yet was unknown to us, as will be seen from the following description; and since this time these two species of plants reappear every year without cultivation in the same portion of the garden. We shall name this second species, *Mercurialis altera foliis in varias & inæquales lacinias quasi dilaceratis.*

It produces a root three or four lines in diameter and six inches long, knotty, provided from its upper portion with several fibrous roots of the same length, much contorted in small equal undulations, which twist towards the bottom of the soil, covered by a quantity of hairy fibers, which extend laterally around the root. Their surface is composed of a chapped, fleshy pellicle of a dirty-white color, which covers a coriaceous and very white woody body, without the slightest indication of pith. From this root there arises immediately a stem about a foot high, a little less thick than the root, hard and woody, covered by a fleshy bark, shiny and smooth, of a pale green color, containing a greenish pith. This shoot from its point of origin to its extremity is furnished with a number of branches, which together form a sort of very small tufted bush, about eight to ten inches in diameter. These branches are arranged upon the stem without regular order, just as the other little branches which they bear, which frequently are subdivided; and nearly all these branches are slightly thickened at their point of origin. An infinite number of clusters of leaves, arranged along the branches and their divisions and subdivisions, covers this little bush. The leaves resemble each other but little. The larger ones, placed near the base of the branches are an inch long and more, measuring one, two or three lines at their greatest width, and in the whole lot there are some which do not measure a third of the width of the preceding. They are all without petioles, and terminate in a very sharp point, having but very slight traces of veins in the middle, which nevertheless are firm and hard, in comparison with their thickness.

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[24] "*. . . qui n'avoient point de sommets*"; sommets, transl. tips, anthers, *apices* of Dodonæus.

The larger of these leaves have as many as four or five incisions. Some are very deep, forming sharp reentering angles and rounded lobes (*formant des angles, rentrans aigus, & des saillans arrondis*). The other incisions, on the other hand, have obtuse reentering angles and very sharp lobes (*les angles rentrans obtus, & les dentelures saillantes fort aiguës*). Several others of these leaves have but one or two incisions, or even but slight crenations not very deep or undulating; and finally a large number of leaves because of their irregular outline, resemble remnants of leaves torn or gnawed by caterpillars.

From the center of each cluster of leaves appears a mass of from twelve to fifteen or twenty flowers collected together, from between which there arise some small, simple and very narrow leaves, in the manner of small strips terminating in a sharp point.

The flower *A* (natural size, Pl. 2), of which the pedicel is very short, consists of a calyx composed of three small leaves (Fig. *C*) of an oval shape, shell-like, of a green-yellow color. In their axils occur from twelve to fifteen filaments *B* of the same color, without tips and two of these filaments always diametrically opposite, being twice the length of the others. The full-blown flower is about one line in diameter. The entire plant is of a brown-green color, mixed with a yellow tinge. Its taste is insipid with a slight nitrous flavor.

These two plants are annuals; at the same time they last much longer than the common Mercury, since they have been observed to germinate in April, and remain green until the end of the month of December.

They resemble each other greatly because of their flowers, their smell and the consistency of their leaves; but they differ exceedingly by their aspect, and, as has been said, in regard to the outline of their leaves.

The opinion commonly held by botanists is that the male Mercury bears seeds and produces no flowers, and that it produces equally the male and the female Mercury, instead of which the female Mercury bears sterile flowers only, that is to say, that it does not produce seeds. On this principle, our two new plants on which we have seen flowers only, would be female Mercuries, resulting from seeds of the male Mercury; but under these circumstances it would be rather difficult to understand why these two plants reappear in this garden only in the same space of seven or eight feet of ground, where they were discovered the first time, since the common male and female Mercuries germinate and grow in great abundance in all the gardens; which would lead one to believe, contrary to the opinions of modern botanists, that the two plants of which we here give descriptions, bear seeds, because they reproduce themselves without aid in this spot, for certainly they are not found anywhere else.

We shall continue our observations on this phenomenon; and in the meantime we shall propose a few conjectures on the large number of species we believe plants may give rise to.

The men of science who are interested in plant culture, and especially those who are fond of plants which bear beautiful flowers, such as the anemones, tulips, carnations and other flowers, well know that the seeds of these plants, being sown, frequently produce pleasing and interesting diversities. Nature, without regard to the beauty of the flowers, behaves in the same manner in the diversity of the species of which it increases the number in the Herbs or Simples.

The instance of our two plants indicates this sufficiently, since in four years we have witnessed the birth of two constant species which were unknown to us.

Because of this observation there would be reason to believe that the Almighty once having created individuals of plants as a model for each genus, made up of all imaginable structures and characters, capable of reproducing their like, that these models, I say, or types of each genus, in perpetuating themselves, finally had produced varieties, among which those which have remained constant and permanent, have constituted the species, which as time went on and in the same manner, have made other different productions which have so increased Botany in certain genera, that it is a fact that to-day there are recognized in some genera of plants as many as one hundred, one hundred and fifty, and even as many as more than two hundred distinct and constant species belonging to a single genus of plants.

The proof of that which is suggested on the subject of the production of species seems all the more well founded, when one remembers that the most ancient botanists have mentioned but about four hundred types of genera of plants, to which they add few species, which leads one to believe that at that time the species were as yet not very numerous; since at present we know more than eight hundred types of genera, to which must be added thirteen or fourteen thousand species or more, among which, it is true, several are mere repetitions, and others are but simple varieties.

One may be sure that botanists, in going through countries which formerly were unknown, will discover new types of genera of plants from the point of view of the physicians, though created many centuries ago, as well as an immense number of species which will have arisen from them. Which, in time to come, and according to the conjectures made above, would tend to reduce Botany to a knowledge of the types of the genera only, giving up the species, to evade the confusion to which they might give rise in this science.

Yet whatever might result from this, we must profit by the new discoveries, to illustrate the history (evolution) of plants.

The species may have still other uses, though it is true that the majority of plants, of which use is made in medicine, are ordinarily those which are called type of the genus, because they are the first in which certain virtues and distinctive characteristics have been recognized, which constitute each genus of plants; but since because of lack of genera, species frequently are substituted for them in Pharmacy, one must not neglect a knowledge of the species, even though there are no living organisms in Nature which increase more abundantly and who make more diversities than do plants, as has been said, always if one excepts Insects, which apparently reach a greater number, but which are not so well known to us as are plants.